

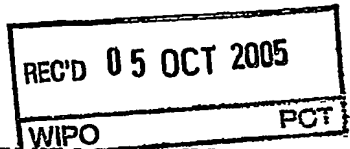
PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference REG/G21144WO	FOR FURTHER ACTION <div style="text-align: right;">See Form PCT/PEA/416</div>	
International application No. PCT/GB2004/003254	International filing date (day/month/year) 26.07.2004	Priority date (day/month/year) 01.08.2003
International Patent Classification (IPC) or national classification and IPC C09D11/10, C09D11/00		
Applicant SERICOL LIMITED et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 01.06.2005	Date of completion of this report 04.10.2005	
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized Officer Ellrich, K Telephone No. +49 89 2399-8295 <div style="text-align: right;"> </div>	

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/003254

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-13 as originally filed

Claims, Numbers

1-16 received on 03.06.2005 with letter of 01.06.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☒ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☒ the claims, Nos. 17
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 14-16

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 14-16

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

**INTERNATIONAL PRELIMINARY REPORT
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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
 - ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-13 .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-13
Inventive step (IS)	Yes: Claims	
	No: Claims	1-13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item IV.

The separate inventions/groups of inventions are:

1-13

An ink containing a polymer having a plurality of 1,2- and/or 1,3-diol groups along the polymer backbone together with crosslinkable pendant groups

14-16

polyvinylalcohol having pendant crosslinkable groups with some exceptions concerning the side chain introducing material with or without diol groups

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

Inks containing polymers being derivatives of polyvinylalcohol modified with low amounts of styryl pyridinium and/or acrylate groups and still having remaining 1,2-/1,3-diol groups in the backbone are known from D1-D3. Consequently, there is no longer an inventive concept linking the inks of invention 1 with the particular polyvinylalcohols of invention 2.

Re Item V.

1 The following documents are referred to in this communication:

D1 : US 5 994 033 A (DAVIDSON ROBERT S ET AL) 30 November 1999 (1999-11-30)

D2 : US 4 564 580 A (ICHIMURA KUNIHIRO ET AL) 14 January 1986 (1986-01-14)

D3 : EP 0 373 862 A (SERICOL GROUP LTD) 20 June 1990 (1990-06-20)

D4 : EP 0 555 070 A (SERICOL LTD) 11 August 1993 (1993-08-11)

D5 : US 4 554 240 A (SCHULZ GUENTHER ET AL) 19 November 1985 (1985-11-19)

2 INDEPENDENT CLAIM 1

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D1 discloses (the references in parenthesis applying to this document): Aqueous inks containing a acrylate-modified PVA (polyvinylalcohol) with a plurality of 1,2-/1,3- diol groups in the backbone together with othe acrylate-monomers (claims, examples).
- 2.2 The like inks having styrylpyridinium side-groups (instead of the acrylategroups) are disclosed in D2 (examples, claims, Col. 5, l. 47-54), or D3 (example 4).
- 2.3 The Applicant has amended the claims by including the feature "ink jet ink" into the claims. Although it is acknowledged that not any ink is "suitable" for ink jet printing, the Applicant has the burden of proof demonstrating that the compositions actually used in the examples of D1 to D3 are not suitable, since the term "ink jet ink" is not a direct structural feature but relates to a later use. The Applicant should consider that the compositions of D1-D3 must not be well suitable for said purpose and that ink jet technology comprises several procedures e.g. thermal or piezoelectric ink jetting. In the absence of convincing data, the compositions of the examples of D1 to D3 are considered to be suitable for ink jet printing in the broadest possible sense of said feature, in particular since the compositions are identical to the structural requirements of present claim 1.
- 3 **DEPENDENT CLAIMS 2-13**
Dependent claims 2-13 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

Claims

1. An ink-jet ink comprising (i) water and (ii) a polymer having a plurality of 1,2- and/or 1,3-diol groups along the polymer backbone and having pendant photo cross-linkable groups attached thereto.
5
2. An ink as claimed in claim 1, wherein the polymer is a polyvinyl alcohol.
3. An ink as claimed in claim 1 or 2, wherein the pendant photo cross-linkable groups are styryl pyridinium and/or acrylate groups.
10
4. An ink as claimed in any preceding claim, where the pendant cross-linkable group is present from 0.1 to 25% by weight based on the weight of the polymer.
- 15 5. An ink as claimed in any preceding claim, wherein the polymer is polyvinyl alcohol which is derived from polyvinyl acetate in which at least 70% of the acetate groups are hydrolysed.
6. An ink as claimed in any preceding claim, wherein the polymer has a degree of polymerisation of 350 to 2500.
20
7. An ink as claimed in any preceding claim, wherein the polymer is present from 0.5 to 60% by weight based on the total weight of the ink.
- 25 8. An ink as claimed in any preceding claim, wherein the water is present from 10 to 90% by weight based on the total weight of the ink.
9. An ink as claimed in any preceding claim, further comprising UV reactive monomers and/or oligomers.
30
10. An ink as claimed in any preceding claim, wherein the UV reactive monomers and/or oligomers are (meth)acrylates, epoxides or oxetanes.
11. An ink as claimed in any preceding claim, further comprising a photoinitiator.

12. An ink as claimed in any preceding claim, further comprising a colorant.

13. An ink as claimed in any preceding claim, having a viscosity of less than 50 mPas at
5 25°C.

14. A polyvinyl alcohol having pendant photo cross-linkable groups attached thereto,
wherein the groups are styryl pyridinium and acrylate groups with the proviso that the
groups are not derived from 4-(2-acryloyloxyethoxy)benzaldehyde and 4-(4-
10 formylphenylethenyl)-1-methylpyridinium methosulfate or 4-(2-
acryloyloxyethoxy)benzaldehyde and 1-(3-ethoxycarbonylpropyl)-4-[2-(4'-
formylphenyl)ethenyl]pyridinium bromide.

15. A polyvinyl alcohol as claimed in claim 14, wherein the groups are derivable from an
15 acryloyloxyalkyl formylbenzoate and a formylphenylethenyl pyridinium.

16. A polyvinyl alcohol as claimed in claim 15, wherein the groups are derivable from 2-
acryloyloxyethyl 4-formylbenzoate and 4-(4-formylphenylethenyl)-1-methylpyridinium.